

# Heavy Lifting Causing Spontaneous Coronary Artery Dissection

with Anterior Myocardial Infarction in a 54-Year-Old Woman

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*Spontaneous coronary artery dissection in association with strenuous exercise and weight lifting is rather sparsely described in the medical literature. Diagnosis and treatment of this rare condition is a challenge, but prompt recognition and appropriate early choice of angioplasty or surgery can lead to a good outcome.*

*We report the case of a postmenopausal 54-year-old woman who presented with anterior myocardial infarction caused by spontaneous dissection of the left anterior descending coronary artery after she had lifted a heavy weight while gardening. The patient was treated successfully by means of angioplasty and the implantation of 3 drug-eluting stents. In addition to presenting the patient's case, we review the topical medical literature. (Tex Heart Inst J 2016;43(2):189-91)*

**S**pontaneous coronary artery dissection (SCAD), a rare cause of myocardial infarction (MI) and sudden cardiac death, can present with various acute coronary symptoms. It usually occurs in the peripartum period. In association with strenuous exercise and heavy lifting, SCAD is rather sparsely documented in the medical literature. We report the case of a patient in whom heavy lifting caused SCAD, and we review the literature on this topic.

## Case Report

In January 2014, a 54-year-old woman had acute-onset retrosternal chest pain immediately after gardening and disposing of a heavy basket of cut grass. She had a normal body weight, no relevant medical history, and no known risk factors for coronary artery disease. She was 4 years postmenopausal. After an hour of worsening pain, she presented at the emergency department, having experienced cardiac arrest and resuscitation en route. After she was intubated, an electrocardiogram (ECG) showed ST-segment elevation in leads V<sub>2</sub> through V<sub>5</sub>, so she underwent thrombolysis. The patient's troponin T level was elevated at 0.4 ng/mL. The next day, her ECG results were consistent with anterior MI. Coronary angiograms revealed a spiral dissection of the left anterior descending coronary artery (LAD) (Fig. 1), which was successfully treated by means of angioplasty and the implantation of 3 drug-eluting stents. The rest of the coronary tree was smooth. The patient was discharged from the hospital after an uneventful 6-day stay, with instructions to take aspirin, prasugrel, a  $\beta$ -blocker, and a statin. Seven months later, results of an exercise ECG were normal, and the patient had returned to normal activity and full-time work.

## Discussion

Coronary artery dissection refers to the splitting of the arterial wall layers, the result of which is a false lumen. This dissection can occur spontaneously; after chest trauma, percutaneous coronary intervention, or cardiac surgery; or as part of aortic dissection. Accumulated blood in the false lumen can encroach on the true lumen, thereby impairing blood flow and causing myocardial ischemia, MI, or sudden cardiac death.<sup>1-5</sup> Since the first description of SCAD,<sup>6</sup> approximately 320 documented cases have been reported. This figure might be misleading, because many of the reports were

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of autopsy findings.<sup>7</sup> The overall incidence of SCAD ranges from 0.3% to 1.1%.<sup>7,8</sup> Most victims are parturient women.<sup>5,9</sup> The LAD is involved in 60% of cases.<sup>5</sup>

Spontaneous coronary artery dissection is often associated with coronary atherosclerosis,<sup>5,8</sup> wherein the local inflammatory process in the plaque disrupts the normal adherence of the intima and media, and hence causes flap formation. In autopsy studies, eosinophilic infiltration has been the most likely explanation for dissection during the peripartum period.<sup>10,11</sup> Eosinophils contain lytic substances, such as peroxidase and collagenase, that break down the medial-adventitial layers, leading to dissection. Increased levels of estrogen and

progesterone during pregnancy and childbirth might also exaggerate the eosinophilic presence.<sup>12,13</sup> Hormones and hemodynamic factors might cause microstructural changes in the elastic and collagen fibers of the aorta.

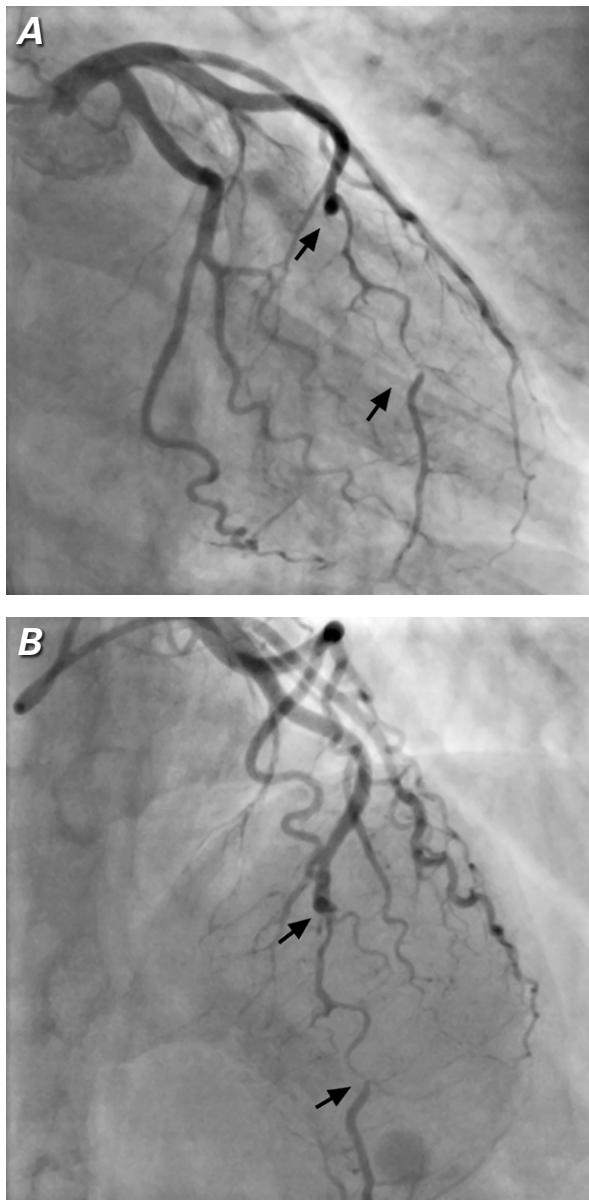
Other clinical conditions have been associated with SCAD, such as hypertension,<sup>14</sup> Marfan syndrome,<sup>15</sup> Ehlers-Danlos syndrome,<sup>16</sup> polyarteritis nodosa,<sup>17</sup> systemic lupus erythematosus,<sup>18</sup> eosinophilic arteritis,<sup>19</sup> and rarer forms of vasculitis that involve the arterial wall. Medications such as oral contraceptives,<sup>20</sup> fenfluramine,<sup>21</sup> and cyclosporine<sup>22</sup> have been implicated. Coronary spasm might worsen variant angina,<sup>23</sup> and cocaine use<sup>24</sup> has also been reported as a cause of SCAD.

Among the cardiovascular sequelae of lifting heavy weight, the chief culprit is vascular stress on arterial walls: during maximal exertion, blood pressure can reach 480/350 mmHg.<sup>25</sup> This mechanical compression and associated phenomena might have caused the SCAD in our patient, who was postmenopausal and had no known coronary risk factors.

The diagnosis of SCAD is usually made using coronary angiography. Also, intravascular ultrasound,<sup>26</sup> multislice computed tomography,<sup>27</sup> and optical coherence tomography<sup>28</sup> yield images of excellent quality.

Treatment for SCAD involves medical therapy and interventional procedures or surgery. The ultimate choice depends upon the individual clinical and angiographic characteristics of each patient. Because so few cases have been reported, there are no guidelines to suggest an appropriate management algorithm. Although thrombolysis has been used with success in patients who have SCAD, primary angioplasty has been recommended as the chief treatment.<sup>29</sup> We used both in our patient's case.

Spontaneous coronary artery dissection is a rare yet well-recognized cause of acute coronary syndromes. In addition to weightlifting,<sup>30</sup> certain predisposing factors and conditions should raise clinical suspicion of SCAD. Prompt diagnosis and appropriate management with early angioplasty are important to optimize clinical care and ensure a good outcome.



**Fig. 1** Coronary angiograms in **A)** right anterior oblique and **B)** anteroposterior views show the left anterior descending coronary artery dissection (arrows).

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